WHAT IS CLAIMED IS:

1. A process for the partial purification of pond water such that said pond water can be further purified by the removal of essentially pure water without solids precipitation, comprising the steps of:

adding a first compound to a quantity of pond water to cause precipitation by reaction with the fluorides in said pond water and form an essentially insoluble fluoride salt;

adding a second compound to said pond water, to increase the pH of the solution, said second compound being a base or forming a base when water is present, said second compound having a cationic portion that causes the phosphate salts thereof to remain soluble,

allowing the precipitates thus formed to settle,

separating the clarified liquid portion of the mixture, holding said liquid portion of the mixture for a time period sufficient to allow the silicic acid present to decompose into hydrated silicon dioxide, separating the hydrated silicon dioxide sludge; and

adding a third compound to decrease the pH of the solution, said added third compound being an acid or acid-forming compound such that the solubility of the ions remaining in solution is increased.

2. The process, as claimed in claim 1, wherein said first compound is a calcium containing compound selected from the group including calcium carbonate, calcium hydroxide or calcium oxide.

3. The process, as claimed in claim 1, wherein said first compound is a magnesium containing compound selected from the group including magnesium carbonate, magnesium hydroxide or magnesium oxide.

4. The process, as claimed in claim 1, wherein the quantity of said first compound added to the pond water is such that molar ratio of said cationic portion of the compound to the fluorine in said pond water is within the range of 0.45 to 0.80.

5. The process, as claimed in claim 1, wherein the quantity of said first compound added to said pond water is such that molar ratio of said cationic portion of said compound to said fluorine in said pond water is within the range of 0.50 to 0.70.

6. The process, as claimed in claim 1, wherein the quantity of said first compound added to said pond water is such that molar ratio of said cationic portion of the compound to said fluorine in said pond water is within the range of 0.55 to 0.65.

7. The process, as claimed in claim 1, wherein said first compound is added to the pond water in essentially dry form.

8. The process, as claimed in claim 1, wherein said first compound is added to the pond water as a slurry or paste.

9. The process, as claimed in claim 1, wherein said second compound is selected from the group including sodium hydroxide and potassium hydroxide.

10. The process, as claimed in claim 1, wherein said second compound is ammonia.

11. The process, as claimed in claim 1, wherein said second compound is added to said pond water as an aqueous solution.

12. The process, as claimed in claim 1, wherein said second compound is added to said pond water in anhydrous or essentially anhydrous form.

13. The process, as claimed in claim 1, wherein said second compound is added to said pond water in sufficient quantity to increase the pH of the resulting solution to a value within the range of 4.2 to 8.0.

14. The process, as claimed in claim 1, wherein said second compound is added to said pond water in sufficient quantity to increase the pH of said resulting solution to a value within the range of 5.0 to 6.5.

15. The process, as claimed in claim 1, wherein said second compound is added to said pond water in sufficient quantity to increase the pH of said resulting solution to a value within the range of 5.5 to 6.0.

16. The process, as claimed in claim 1, wherein after said first compound is added to said pond water the solids thus formed are allowed to settle and are separated from the pond water, before adding the said second compound to the pond water.

17. The process, as claimed in claim 1, wherein after separating an essentially clear liquid from said precipitates formed as a result of the addition of said first compound and said second compound, the clear liquid is aged for a time period within the range of 16 hours to 10 days.

18. The process, as claimed in claim 1, wherein after separating an essentially clear liquid from the sludge formed as a result of the addition of the first compound and the second compound, the clear liquid is aged for a time period within the range of 36 hours to 72 hours.

19. The process, as claimed in claim 1, wherein after separating said hydrated silicon dioxide sludge, said third compound is added to said clear liquid thus obtained in sufficient quantity to lower the pH of the solution to a value within the range of 2.0 to 4.0.

20. The process, as claimed in claim 1, wherein after separating said hydrated silicon dioxide sludge, said third compound is added to said clear liquid thus obtained in sufficient quantity to lower the pH of the solution to a value within the range of 2.5 to 3.5.

21. The process, as claimed in claim 1, wherein after separating said hydrated silicon dioxide sludge, said third compound is added to said clear liquid thus obtained in sufficient quantity to lower the pH of the solution to a value within the range of 2.9 to 3.1.

22. The process, as claimed in claim 1, wherein said third compound added to said clear liquid obtained after the separation of said hydrated silicon dioxide sludge is selected from the group including sulfuric acid, sulfurous acid, phosphoric acid, hydrochloric acid and nitric acid.

23. The process, as claimed in claim 1, wherein said third compound added to said clear liquid obtained after the separation of said hydrated silicon dioxide sludge is sulfuric acid.

24. The process, as claimed in claim 1, wherein after separating said hydrated silicon dioxide sludge, said third acid-forming compound is added to said clear liquid thus obtained in sufficient quantity to lower the pH of the solution to a value within the range of 2.0 to 4.0.

25. The process, as claimed in claim 1, wherein after separating said hydrated silicon dioxide sludge, said third acid-forming compound is added to said clear liquid thus obtained in sufficient quantity to lower the pH of the solution to a value within the range of 2.5 to 3.5.

26. The process, as claimed in claim 1, wherein after separating said hydrated silicon dioxide sludge, said third acid-forming compound is added to said clear liquid thus obtained in sufficient quantity to lower the pH of the solution to a value within the range of 2.9 to 3.1.

27. The process, as claimed in claim 1, wherein said third acid-forming compound added to said clear liquid obtained after the separation of said hydrated silicon dioxide sludge, is selected from the group including sulfur trioxide, sulfur dioxide, hydrogen chloride and nitrogen dioxide.

28. A process for the partial purification of pond water, comprising the steps of:

(a) adding a first compound to a quantity of pond water that will react with the fluorides in the pond water and form an essentially insoluble fluoride salt;

(b) adding a second compound that is either basic or will form a base when water is present, the cationic portion of said second compound being such that the phosphate salts thereof remain soluble, separating the solid precipitates thus formed and obtaining an essentially clear liquid containing 0.5% or less solids, aging the clear liquid for a time period within the range of 16 hours to 72 hours, separating the hydrated silicon dioxide sludge formed during the aging period; and

(c) adding a third compound that is an acid or that will form an acid in the presence of water, to the clear liquid solution thus obtained to lower the pH, such that at least 50%, by volume, of the water present in the thus treated solution can be removed from the solution without additional solids precipitation.

29. A process for the partial purification of pond water, comprising the steps of:

(a) adding a calcium containing compound to the pond water, selected from the group including calcium carbonate, calcium hydroxide and calcium oxide, such

that the molar ratio of calcium to the fluorine in the pond water is within the range of 0.45 to 0.80;

(b) adding a base or a compound that will form a base when water is present, selected from the group including sodium hydroxide, potassium hydroxide and ammonia, to the calcium treated pond water, in sufficient quantity to increase the pH to a value within the range of 4.2 to 8.0;

(c) separating the sludge produced as a result of the calcium compound addition and base addition and obtaining a clear liquid containing 0.5% or less solids by weight;

(d) aging the clear liquid thus obtained for a time period within the range of 16 hours to 72 hours;

(e) separating any solids formed in the liquid during the aging time and again obtaining an essentially solids free liquid; and

(f) adding an acid, selected from the group including sulfuric acid, sulfurous acid, phosphoric acid, hydrochloric acid and nitric acid, to the solids free liquid thus obtained, in an amount sufficient to decrease the pH to a value within the range of 2.0 to 4.0.